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THE IDENTIFICATION OF PLANT MATERIAL
AT THE ARNOLD ARBORETUM

THERE are many ways in which the Arnold Arboretum furnishes the public with information concerning trees and shrubs. One of these is the identification of plant material sent through the mail. Most of the work of identifying plants is done in the herbarium, and it may be interesting and helpful to give some account of how the work is handled.

When a specimen is received at the Arboretum, it is examined by some member of the staff, who may be able to identify it at sight. Some plants are so distinct and easily recognizable that it may be possible to name them from a single typical leaf or fruit, but often the problem is not so simple. If the plant is not readily recognized, the investigator tries to limit it to certain plant families through such characters as are shown by the specimen, and then proceeds to follow up clues that may lead to its full identification. This is done by comparing it with mounted specimens in the herbarium, or, if possible, with living plants, and by consulting descriptions and illustrations in the literature dealing with the group to which it is thought to belong. This may involve much library and herbarium search, and hours may be spent in solving a particularly difficult problem. Sometimes the material received is so inadequate that the investigator must send for a more typical specimen. However, because of an unwillingness to disappoint the inquirer and because a difficult problem offers something of a challenge, every effort is made and every means is exhausted before such a course is taken. In cases where some doubt may remain after a careful study of the material, the investigator often consults with other members of the staff, especially if the plant belongs to a group with which one of his colleagues is especially familiar.

Plants are extremely variable, there often being a wide range of diversity in various characters even within a single species. Some groups of plants are much more variable than others. For example, in the roses, apples, plums, hawthorns, cherries and others, there is such great variability that authorities differ widely as to their classification. Some recognize numerous species based on slight varia-

tions while others place these slightly varying forms under a single name. The leaves of a species may differ greatly in shape and size, not only in different plants, but even on a single plant; while sometimes flowers, fruits and other parts are equally variable. Again, the leaves of seedlings, young plants, or those from vigorous shoots are very different from those of the mature plant or of typical flowering branches. Some of the divergent forms seem to be due to ecological conditions, such as the character of the soil, or the amount of light, moisture and shade received. Some of these aberrant forms can be accounted for only as sports or abnormalities, some as hybrids between related species, and in other cases they can only be regarded as individual differences, which are common to all living things. Consequently, when branches are selected for identification they should be taken from a normal plant. They should be fully matured in growth, but not have reached maturity too fast, due to excessive vigor, or too slowly, due to poor growth conditions, insect or disease troubles. If normally matured typical branches are selected, the inquirer will go a long way in assisting the Arboretum staff to correctly identify specimens.

A vast amount of literature has been written about plants, and this is being increased each year by students of various groups in all parts of the world. That the subject of plant classification is one regarding which the last word has not been said is shown by the fact that for the higher groups of plants alone about 6500 new binomials are published each year, of which approximately 4750 represent species supposed by their sponsors to represent previously unnamed and undescribed ones. Furthermore, many groups are subject to constant study and revision. Good manuals, covering the floras of most parts of the United States have been published and many other reference books about both native and cultivated plants are available. Some of these books are fully illustrated and contain keys and descriptions that make them valuable and almost indispensable to serious students of plant life. However, the information they contain is limited, because of the great number of species considered, and it is impossible to include in them more than brief descriptions, these usually limited to the typical forms. In any event, when a specimen comes to the Arboretum for identification, the investigator is familiar with these various sources of information, and thanks to the excellent library facilities available, he can turn to the desired references immediately.

Suggestions for shipping

In sending material for identification, a few simple rules, if observed, may save disappointment to the inquirer as well as much time and trouble to the Arboretum staff. For the identification of trees or shrubs a small branch should be sent which bears flowers or fruit, as well as typical leaves. The specimen may either be pressed and mailed dry between cardboards, or if the material is not too fragile or the distance too great, it may be sent fresh. Fresh specimens may be placed between paper and cardboards or packed in waxed or slightly dampened paper and either mailed in a carton or protected by heavy wrapping paper. When more than one specimen is sent, each should have a number attached to it, and a list should be sent with corresponding numbers, giving as much information as pos-

sible about the plant. In doing this, the same numbers should be given to the plants from which the specimens were taken. Large fruits, not attached to the branches, may be wrapped separately and should also bear the same number as the leaf specimen to which they belong. It should be indicated whether the plant is a tree, shrub or vine, the approximate height and general habit or shape, also whether it was found wild or in cultivation; if from cultivated plants, the source of the plant or seed should be indicated if known. It is also helpful to give the popular or local name, if known, and to state the color of the flowers which may be too much faded when they arrive for this to be determined.

In the case of crab apples and similar plants represented in gardens by numerous hybrid forms, both flowers and fruits are often necessary for identification; herbarium specimens of both stages from the same plant, or herbarium specimens of one and fresh specimens of the other should be sent at the same time. With thousands of specimens sent each year for identification, it is manifestly impossible to preserve the specimens sent and keep track of corresponding specimens received at different seasons of the year.

However, it is not always possible to send samples of flower and fruit of deciduous plants. In some cases, particularly with the general run of nursery stock, accurate identification can be made without these aides, but in most cases they are necessary. For instance, it is comparatively easy to identify a normal twig of a crab apple, but with a few exceptions, almost impossible to tell the exact variety without the flowers or fruit or both. The inquirer should keep these points in mind and not expect the impossible where flowers and fruits are not sent.

Many of the evergreens however, cannot be readily distinguished without cones, if at all, and thus cones should always be sent if possible. Some cultivated forms and varieties are distinguished solely by the shape or habit of the plant, and can thus be recognized only if information about these characters be given. In some cases it is necessary to have mature acorns or nuts in order to distinguish between different species or varieties of hickories and oaks, and both flowers and fruit may be necessary before some species of plums, apples and haws can be determined.

The inquirer sending a plant for identification naturally desires to learn a definite name for it, and in the great majority of cases, it is possible to give this information if the material received is at all adequate or typical. Sometimes, because of meager, incomplete, or poorly preserved specimens, identification is impossible. In some cases, even though the material is ample, only approximate identification is possible, because the specimen may not be typical and may differ in some character from the species to which it seems most closely related. This anyone who has had considerable experience in studying plants readily understands but to the inexperienced, it is sometimes difficult to explain why definite identification of the species, variety or form is not always possible.

The material received for identification at the Arboretum ranges from a single specimen, sometimes unfortunately consisting only of a detached leaf or fruit, to collections numbering hundreds of specimens. Occasionally seeds, sterile twigs, resins, gums, and specimens of wood are submitted for identification. Many speci-

mens of herbaceous plants are sent to the Arboretum, although our living and reference collections are limited to woody material. Occasionally even mosses, lichens, and fungi are sent to us from friends who seem to have too great confidence in our stock of information. These may be referred to other departments of the University, such as the Gray Herbarium in case of herbaceous species, and to the Farlow Herbarium for cryptogamic plants.

The correspondents who call upon the Arboretum for information range from professors of botany in leading educational and scientific institutions to persons with little or no knowledge of plants. The Arboretum is also often called upon for advice by commercial concerns and by importers of various commodities, utilized in industry. Occasionally, we have been asked to furnish evidence to be used in litigation, or even to settle a wager. During the height of the cross-word puzzle craze, numerous inquiries were received, most of them by telephone, regarding the name of some tree or other plant with vaguely described characters but containing a definite number of letters. After a few good-natured efforts to comply with these requests it was decided that this was not really part of our mission in the world.

There are no fixed formulas for identifying plants, nor does the scientist possess any occult powers for distinguishing them. All that the investigator can do is to examine the material available, noting the characters shown, and try to place it in its proper relationship in view of what he knows about plant classification and the characteristics that distinguish plant families, genera and species. Only when good material is supplied can the determination be made with facility and certainty.

The botanist is not infallible and he is not dealing with an exact science. If he is honest, he will sometimes have to express a doubt, or admit that he does not know, and at times he may make mistakes. As an illustration of the difficulty found in some groups of plants, a botanist in one of the western states, in studying the plants of his region, found a number of specimens of wild roses that were difficult to classify, and some of these were sent to other botanists for study. In one case he reports sending identical specimens from the same plant to four of the leading botanical institutions of America, and of receiving in reply four different opinions as to the identity of the plant. Being himself a botanist and realizing some of the difficulties involved, he did not, as a result, completely lose confidence in the institutions nor in the value of the opinions of the man connected with them; at least he is still sending puzzling specimens to the Arboretum for determination.

From the appreciative letters received from correspondents who have called upon us for help, we believe that the service the Arboretum is rendering in plant identification is a useful one. We wish to make the service as efficient as possible and to answer all inquiries as promptly and as fully as we can. It is hoped that this explanation of the methods followed and of the limitations of the service may be mutually advantageous to our correspondents and to the Arboretum.

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